

Work Order ID 76246

76246

Page 1

November-07-11 3:31:44 PM

Item ID: D212-664-107

Accept

N9000040100

Setup Start

NS1

Revision ID:

Stop

NS2

Item Name: Crosstube Low Standard Fwd

Start Date: 07/11/2011 Start Qty: 1.00

1

Cust Item ID:

Required Date: 21/11/2011 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan: MLJDate: 11/11/07

Tooling:

Date:

Run Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr

Revision Nbr

D212-664-147

Rev B (DEO)

100

0.00

100

DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D212-664-107 CHG003

4 D519562

5/2/3/27

HJ for MLJ 12-3-27

110

0.00

110

Packaging

Packaging

Memo

0.00

Packaging

JW

12-3-13

120

0.00

120

BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D212-664-107 using CNC bender program 212-107

JW
MO
Ry

12-3-04

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 76246***76246***

Page 2

Item ID: D212-664-107

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Crosstube Low Standard Fwd

Start Date: 07/11/2011 Start Qty: 1.00

1

Cust Item ID:

Required Date: 21/11/2011 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

130 QC15- Crosstube Dimensional Check

0.00

130

0.00

QC

Memo

Quality Control

140

0.00

140

Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1-Cut tube as per inspection dwg and deburr ends. ***ensure saw is square***

2-Position cuffs on tube ensure proper positioning

3-Drill tube as per dwg using DT8577 location #7 & # 212 ULF using jig
DT8548 and DT8549 as per QSI 10

4-Transfer drill rivet holes from cuff into tube.

5-Identify cuff position and Batch # on each and identify tube as per dwg D212-
664-107.

6- Inspect surface damage

7- Deburr and realodine cuff.

X

Jaw

12-3-14

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Page 3

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 Required Date: 21/11/2011 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150	Crosstubes Chemical Conversion	0.00							
150									
HandFXtube	Memo	0.00							
Hand Finishing Crosstubes									
160	QC3- Inspect Part Finish	0.00							
160									
QC	Memo	0.00							
Quality Control									
170	QC5- Inspect part completeness to step on W/O	0.00							
170									
QC	Memo	0.00							
Quality Control									

x MO 12/3/15

5 12/3/15

5 12/3/15

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Page 4

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180	Outsource process - NDT per QSI038 4.1	0.00							
180									
Outsource2	Memo	0.00							
Outsource process - NDT	Liquid Penetrant Inspection as per QSI 038Or Issue P/O: _____ LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order								
190		0.00							
190	Packaging								
Packaging	Memo	0.00							
Packaging	Ensure copy of NDT results attached to work order.								
200	QC5- Inspect part completeness to step on W/O	0.00							
200									
QC	Memo	0.00							
Quality Control	Inspect for damage & ensure results are as per Dwg D212-664-107								

12-03-15

12/3/10

5/17/16

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Page 5

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Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

210

0.00

210

Crosstubes

Crosstubes

Memo

0.00

1-Rivet Cuffs as per Dwg D212-664-147. with Sika flex in Between tube & Cuff
A/R SIKAFLEX -241/-291 BATCH: 119999

12 12-3-15

215

QC5- Inspect part completeness to step on W/O

0.00

215

QC

Memo

0.00

Quality Control

12 12 03 19 (1)

W/O:		WORK ORDER CHANGES					
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November-07-11 3:31:44 PM

76246

Page 6

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 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
220	SprayPaint	0.00							
220									
SprayPaint	Memo	0.00							
Spray Painting	1-Prime inside and outside crosstube as per QSI 005 4.2								
	2-Paint outside crosstube with White Imron as per QSI 005 4.2								
	PRIME:								
	Start Time: <u>11:00</u>								
	Finish Time: <u>12:00</u>								
	PAINT:								
	Start Time: <u>4:30</u>								
	Finish Time: <u>5:15</u>								
230	QC14- Inspect Spray Paint	0.00							
230									
QC	Memo	0.00							
Quality Control	Wrap in plastic bag to protect from scratches								

12 - 3 - 22

8/12/13/26

16

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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November-07-11 3:31:44 PM

76246

Page 7

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 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240	Crosstubes	0.00							
240									
Crosstubes	Memo	0.00							
Crosstubes	1- Assemble as per Dwg D212-664-147								
	1-Abrade mating surfaces of support and crosstube with 400 grit sandpaper, clean the area with 4105S wash 'n' wipe								
	2-Install supports with Proseal 890 per DS19563 and QSI 015 A/R Proseal 890 Batch: <u>120 867</u>								
	3- Torque bolts as per dwg								
250	QC5- Inspect part completeness to step on W/O	0.00							
250									
QC	Memo	0.00							
Quality Control									

AS 12 - 3 - 26

12 03 27 (1)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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November-07-11 3:31:44 PM

76246

Page 8

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 Start Date: 07/11/2011 Start Qty: 1.00 ***1*** Cust Item ID:
 Required Date: 21/11/2011 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
255	Pick Kit	0.00							
255									
Packaging	Memo	0.00				JB			12/03/27 ①
Packaging									
260	QC4- 100% Inspect kits for completeness	0.00							
260									
QC	Memo	0.00							5.263/27
Quality Control									
270	Packaging	0.00							
270									
Packaging	Memo	0.00							Rec c
Packaging	Identify and pack for shipping as per PPP D212-664-107					12/3/27			①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Work Order ID 76246***76246***

Page 9

November-07-11 3:31:44 PM

Item ID: D212-664-107

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Crosstube Low Standard Fwd

Start Date: 07/11/2011 Start Qty: 1.00

1

Cust Item ID:

Required Date: 21/11/2011 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
280	QC21- Final Inspection - Work Order Release	0.00							
280									
QC	Memo	0.00							
Quality Control									

12/3/28 JH
12-03-28

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

Picklist Print

November-07-11 3:31:48 PM

Page 1

Work Order ID: 76246

76246

Parent Item: D212-664-107

D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 07/11/2011

Required Date: 21/11/2011

Start Qty: 1.00

Required Qty: 1.00

Comments:

IPP Rev:A New Issue 07.09.12 EC verified by: JLM
 IPP Rev:B ECN 1100 08-01-11 DD verified by: EC
 IPP Rev:C Ecn 1121 08-02-25 DD Verified by:ec IPP Rev:D
 10.05.27 added pick kit DD verf:EC IPP Rev:E 11.10.17
 added SEQ 215 DD verf:EC IPP REV:F 11.11.03 as per
 chg003 DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D212-664-107TRN		Manufactured	No			140	Each	7.0000	1	1			
D212-664-107TRN									**				
Crosstube Turning Detail													

Location	Loc Qty	Loc Code
LG	5	
74250	1	
74572	1	
75129	1	
75130	1	
75210	1	
LG046	2	
74249	1	
75881	1	

D3659-1

Manufactured No

220

Each

24.0000

2

2

D3659-1

CUFF

**

Location	Loc Qty	Loc Code
ST477	24	
67005	3	
74737	8	
75173	13	

2

MO 12/3/13

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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November-07-11 3:31:48 PM

Page 2

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76246

Parent Item: D212-664-107

D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 07/11/2011

Required Date: 21/11/2011

Start Qty: 1.00

Required Qty: 1.00

CR3212-4-06

Purchased

No

240

Each

678.0000

44

44

CR3212-4-06

CHERRY RIVET

Ag 12-3-15

Location

Loc Qty

Loc Code

ST311 119717

678

44

112492

18

112794

360

119510

300

D3595-063-450

Manufactured

No

240

Each

174.7600

4

4

D3595-063-450

RUBBER CUSHION

Ag 12-3-26

Location

Loc Qty

Loc Code

LG

77.76

(4)

67353

3

68893

6

70113

0.56

71354

0.2

74113

68

LG055

97

75597

97

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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November-07-11 3:31:48 PM

Page 3

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Parent Item Name: Crosstube Low Standard Fwd

Start Date: 07/11/2011

Required Date: 21/11/2011

Start Qty: 1.00

Required Qty: 1.00

MS21920-25

Purchased

No

240

Each

64.0000

4

4

MS21920-25

Clamp(per MIL-DTL-8783C)

**

AB 12-3-26

Location

Loc Qty

Loc Code

LG

58

113281

0

113282

0

118142

4

118183

4

119339

50

LG050

6

116264

2

117998

4

D2893-1

Manufactured

No

240

Each

3.0000

2

2

D2893-1

2.75 Support

**

AB 12-3-26

Location

Loc Qty

Loc Code

LG052

3

72865

3

260

Each

11.0000

1

D3428-1

Manufactured

No

D3428-1

Placard

**

78933

JB [Signature]

Location

Loc Qty

Loc Code

ST053

11

73498

11

November-07-11 3:31:48 PM

Shop Packet Print

12/03/27
Page 3

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November-07-11 3:31:48 PM

Page 4

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Parent Item Name: Crosstube Low Standard Fwd

Start Date: 07/11/2011

Required Date: 21/11/2011

Start Qty: 1.00

Required Qty: 1.00

AN6-35A

Purchased

No

260

Each

86.0000

AN6-35A
BOLT

**

4

4

120187 JB



Location

Loc Qty

Loc Code

ST342

86

118422

6

118838

30

119449

50

AN6-36A

Purchased

No

260

Each

86.0000

AN6-36A
Bolt

**

4

4

120187 JB



Location

Loc Qty

Loc Code

ST342

86

118422

6

118838

30

119449

50

MS21042L6

Purchased

No

260

Each

1,614.000

MS21042L6
Nut

**

6

6

119075 JB



Location

Loc Qty

Loc Code

ST300

614

117677

25

118384

5

118927

48

118968

536

ST518

1000

119075

1000

AN960JD616

NAS1149D0663J

Purchased

No

260

Each

0.0000

AN960JD616
Washer

**

18

18

119075 JB 12/03/27



November-07-11 3:31:48 PM

Shop Packet Print

Page 4

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

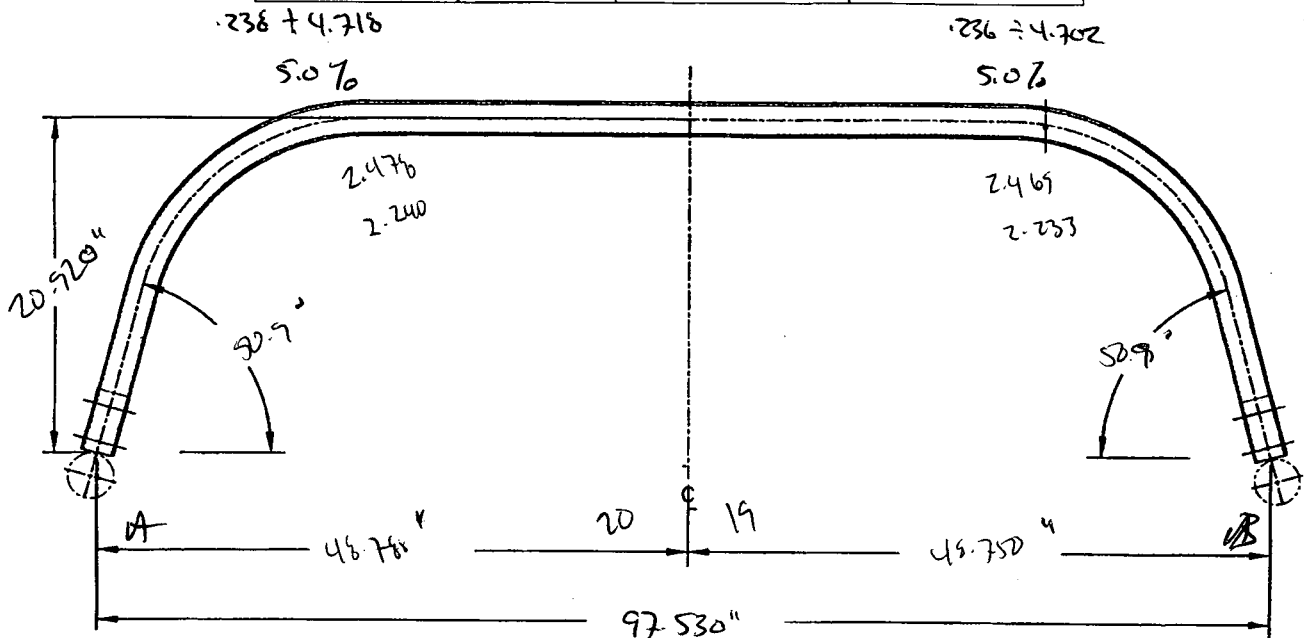
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NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	76246
Description: Crosstube Low Fwd (205/212/412)		Part Number:	D212-664-107
Inspection Dwg: D212-664-147 Rev: B		Page 1 of 1	

Required Dimension	Min	Max
Height	20.79	21.05
1/2 Span	48.55	48.81
Angle	49	52
Total Span	97.1	97.62



Comments	
Side A =	5.0% crushing @ 70 Passes
Side B =	5.0% crushing @ 19 Passes

QC15 Inspection	8
Date	12/03/14

Rev	Date	Change	Revised by	Approved
A	08.02.29	New Issue	KJ/JM	
B	10.01.21	Dwg Rev updated	KJ	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Item	Qty -147	Qty -147B	Part Number	Description
1	X		D212-664-147	CROSSTUBE ASSEMBLY (205/212/412 LOW FWD)
2		X	D212-664-147B	CROSSTUBE ASSEMBLY (214 LOW FWD)
3	1	1	D6019-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	2	2	D3659-1	CUFF
7	4	4	MS21920-25	CLAMP (OR MS21920-26)
8	44	44	CR3212-4-06	RIVET (OR M7885/3-4-06)
9	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
10	A/R	A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6019-128
FINISHED LENGTH = 126.528±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF
USING VIBRATING STYLUS.
- 7) WEIGHT: D212-664-147 = 24.2 lbs (PER IIN-D212-664)
D212-664-147B = 24.2 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) WHEN MACHINING TAPER, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD
BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6%
BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF
D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER
INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE
SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS.
DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE
UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN.-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS
NOT BOTTOMED-OUT AFTER TORQUING.
- 16) INSTALL D3659-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT. WITH A LAYER OF
SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE.
SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 17) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

SHOP COPY
RETURN TO
ENGINEER
FOR ONE COPY
SUBJECT TO COMMENT
WITHIN 30 DAYS
NO. 76246 M.L.S
11/11/07

DEO ATTACHED

Per ECN #1164
11.07.20
UNDER REVIEW

RELEASED
2009-10-29

B	REVISE GENERAL NOTES/PART LIST; UPDATE TO CURRENT STANDARDS: ADD -147B (ZN C4-2, D4-2)	RF	09.09.30
A	NEW ISSUE	CP	07.07.07
REV.	DESCRIPTION	BY	DATE
DESIGN	RF	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF	DRAWING NO.	REV. B
CHECKED	RF	D212-664-147	SHEET 1 OF 4
MFG. APPR.	RF	TITLE	SCALE
APPROVED	RF	CROSSTUBE (205/212/412 LOW FWD)	NTS
DE APPR.	RF	DATE 09.09.30	
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

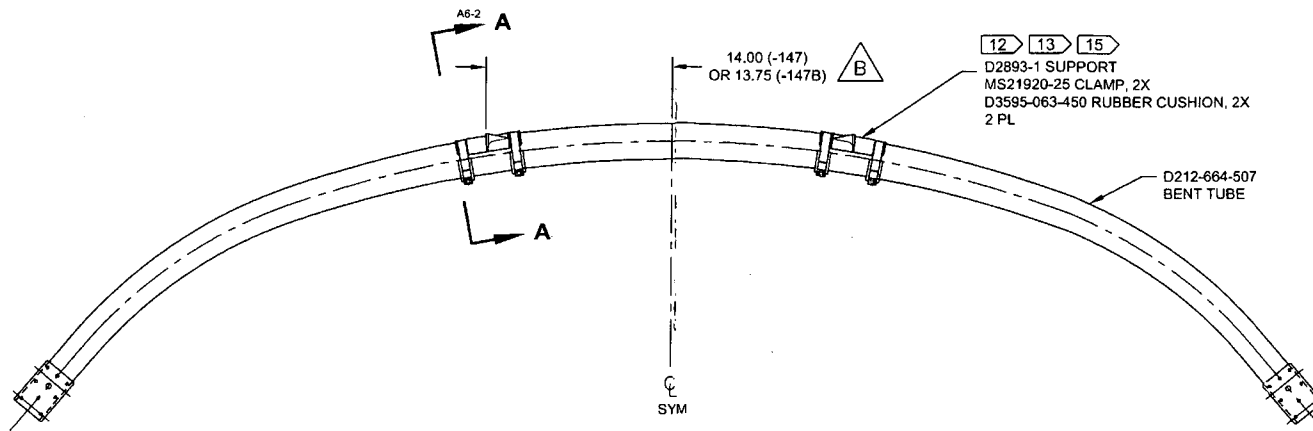
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

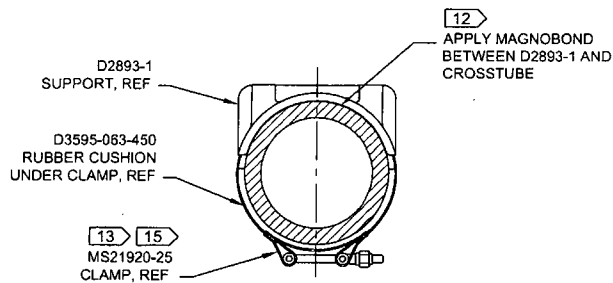
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

76246



D212-664-147/-147B
ASSEMBLY DETAIL B



SECTION A-A D5-2
SCALE 4X

DEO ATTACHED

BCU #11-614
K. 09.20
UNDER REVIEW
09.11.06.13

RELEASED
2009-10-29

DESIGN	90	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	90	DRAWING NO.	REV. B
MFG. APPR.	18	D212-664-147	SHEET 2 OF 4
APPROVED	14	TITLE	SCALE
DE APPR.	14	CROSSTUBE (205/212/412 LOW FWD)	NTS
DATE	09.09.30	<small>COPYRIGHT © 2007 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIES OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

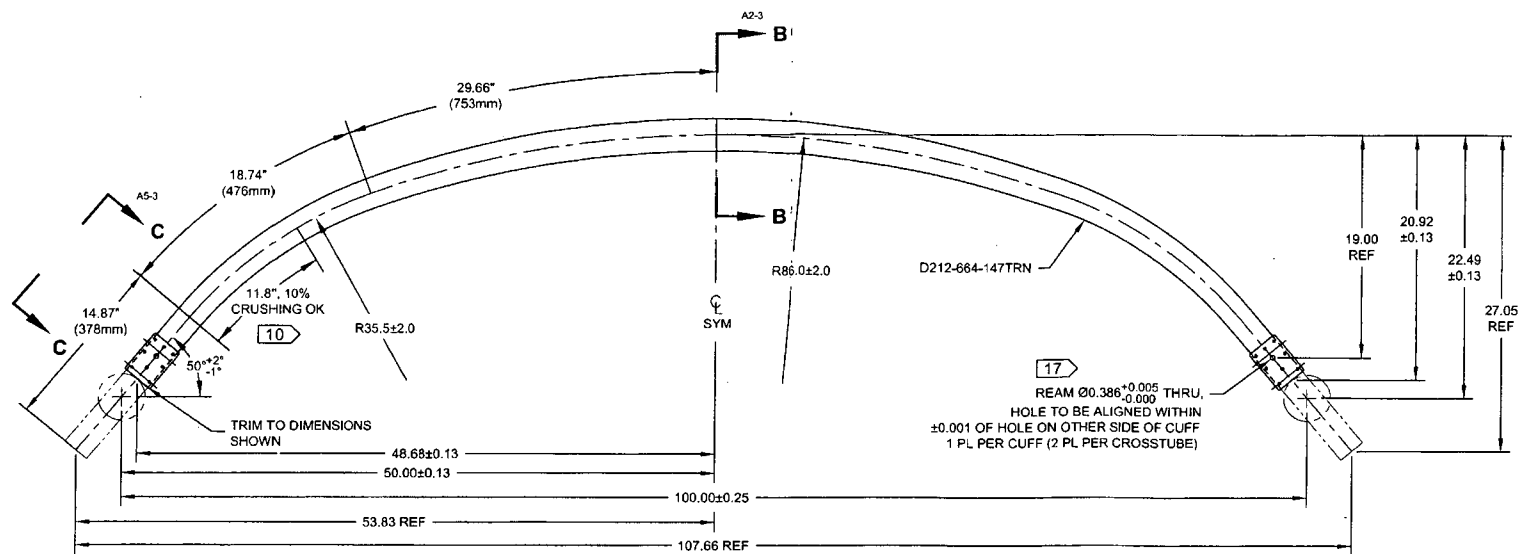
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

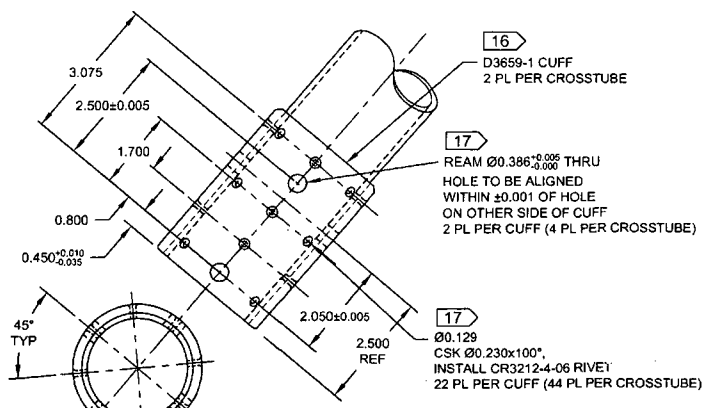
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

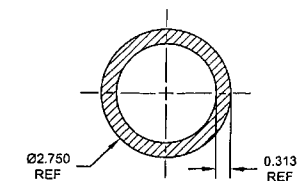
76246



D212-664-507
BENDING AND DRILLING DETAIL 10 B



VIEW C-C: CUFF DETAIL D7-3
 SCALE 4X



SECTION B-B D5-3
 SCALE 4X

50011-614
 09.09.20
UNDER REVIEW
 09.09.13

RELEASED
 2009-10-29

DESIGN	RF	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. B
MFG. APPR.	RF	D212-664-147	SHEET 3 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE (205/212/412 LOW FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2007 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

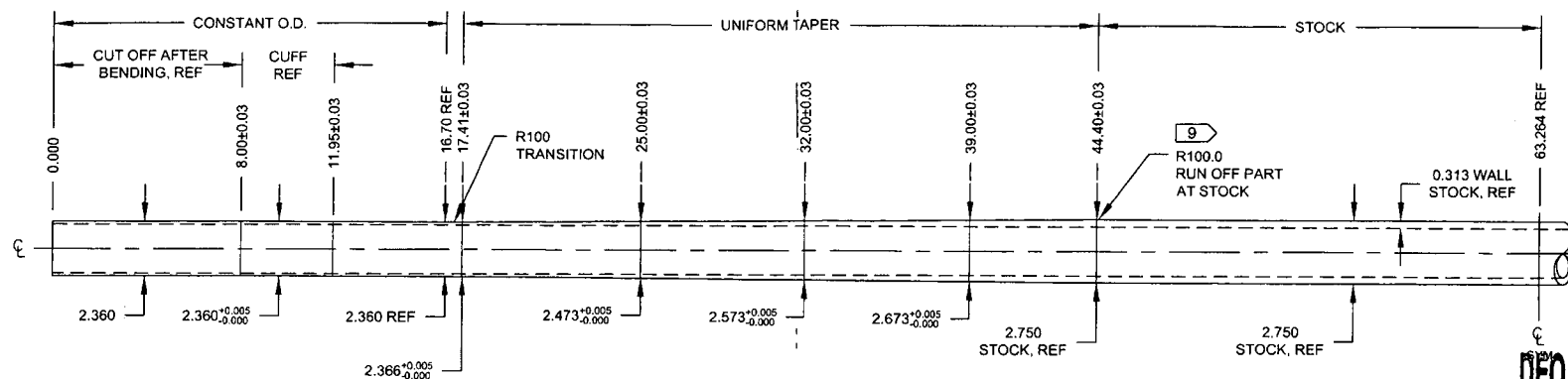
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

76246



D212-664-147TRN
TURNING DETAIL

DEO ATTACHED

ECO #11-614

11.07.26

UNDER REVIEW

11/08/13

RELEASED
2009-10-29

DESIGN	RF	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. B
MFG. APPR.	RF	D212-664-147	SHEET 4 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE (205/212/412 LOW FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2007 BY DART AEROSPACE LTD	
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.			

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

76246

DRAWING NO. D212-664-147	TITLE CROSSTUBE ASS'Y (205 LOW FWD)	REV. B	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D212-664-147-B-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN qp	CHECKED ASS	MFG. APPR. 18		APPROVED MP	DE APPR. H		
DATE 11.07.15	DATE 11.07.20	DATE 11.07.21	DATE 11/07/21	DATE 11.07.21	DATE 11.07.21		

PURPOSE:

REPLACE MAGNOBOND WITH PROSEAL.

CHANGE:

IS:

Item	Qty -147	Qty -147B	Part Number	Description
9	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

WAS:

9	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
---	-----	-----	----------------	---

NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) TO INSTALL D2893-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. **PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.**

WAS:

- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED
2011-07-28
WMA

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

5.2 STANDARD GEAR CROSSTUBES

Item	-107	-207	-209	Part Number	Description
	X			D212-664-107	CROSSTUBE INSTALLATION, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD FWD
		X		D212-664-207	CROSSTUBE INSTALLATION, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD AFT
			X	D412-664-209	CROSSTUBE INSTALLATION, 412 STANDARD AFT
6	1			D212-664-147	CROSSTUBE ASSEMBLY, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD FWD
7		1		D212-664-247	CROSSTUBE ASSEMBLY, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD AFT
8			1	D412-664-249	CROSSTUBE ASSEMBLY, 412 STANDARD AFT
10	2			* D2893-1	SUPPORT
11	4			* D3595-063-450	RUBBER CUSHION
12	4			* MS21920-25	CLAMP (OR MS21042-26)
13	4			AN6-35A	BOLT
14	4			AN6-36A	BOLT
15	6			MS21042L6	NUT (OR MS21042-6)
16	18			AN960JD616	WASHER
20		2		* D2940-1	SUPPORT
21		4		* D3595-063-530	RUBBER CUSHION
22		4		* MS21920-28	CLAMP (OR MS21042-30)
23		4		AN6-40A	BOLT
24		2		AN6-41A	BOLT
25		6		MS21042L6	NUT (OR MS21042-6)
26		18		AN960JD616	WASHER
30			1	* D2896-1	SUPPORT
32			2	* D3595-063-570	RUBBER CUSHION
33			4	* MS21920-28	CLAMP
34			2	* MS21920-30	CLAMP (OR MS21042-32)
35			4	AN6-40A	BOLT
36			2	AN6-41A	BOLT
37			6	MS21042L6	NUT (OR MS21042-6)
38			18	AN960JD616	WASHER
39			2	* D3189-1	CHAFING SHIELD
45	2			* D3659-1	CUFF
46		2	2	* D3660-1	CUFF
47	44	44		* CR3212-4-06	RIVET (M7885/3-4-06)
48			44	* CR3212-4-07	RIVET (M7885/3-4-07)
50	1	1		D3428-1	PLACARD

*REFERENCE ONLY. PARTS ARE INCLUDED IN D212-664-147/-247 OR D412-664-249 ASSEMBLIES ABOVE
NOTE: KITS INCLUDE EXTRA HARDWARE FOR COMPATIBILITY WITH BOTH DART AND BELL/AAI
SKIDTUBES.



LIQUID PENETRANT TEST REPORT

P- 14910

CLIENT	<u>Dart Aerospace</u>	DATE	<u>March 15/12</u>	PAGE	<u>1</u>	OF	<u>1</u>
ATTENTION	<u>LINDA LACELLE</u>	ACUREN JOB NO.	<u>188-12-00067</u>	TIME	AM <input checked="" type="checkbox"/>	PM <input type="checkbox"/>	
ADDRESS	<u>1270 ABERDEEN</u> <u>HAWKESBURY, ON.</u>	PO/VO NO.	<u> </u>				
		WORK LOCATION	<u>HAWKESBURY</u>				
		ACCEPTANCE STD.	<u>ASTM 1417/00-03</u>	REV./DATE	<u>2005</u>		
PROJECT	<u>F.P.I. ON CROSS TUBES AND MACHINED PARTS</u>						
ITEM(S) EXAMINED	<u>(7) CROSSTUBES, (1) MACHINED SLEEVES</u>						

JOB DESCRIPTION	PROCEDURE NO. <u>LT-902</u> REV./DATE <u>2008</u>	TECHNIQUE NO. <u>LT-902</u> REV./DATE <u>2008</u>
PART NO.	<u>SEE RESULTS</u>	MATERIAL <u>STAINLESS STEEL</u> THICKNESS <u>VARIOUS</u>
SCOPE	<u>AVIATION FLUORESCENT LIQUID PENETRANT INSPECTION</u> <u>WAS CARRIED OUT ON 100% EXTERNAL SURFACE.</u>	

TEST DETAILS			
METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH
FAMILY BRAND	<u>UNIDIFLUX</u>		<input type="checkbox"/> SOLVENT REMOVABLE
PENETRANT	<u>2607</u>	MINIMUM DWELL TIME <u>450</u> MIN.	<input type="checkbox"/> POST EMULSIFIED
PENETRANT REMOVER	<u>H2O</u>	MINIMUM DRY TIME <u>>10</u> MIN.	<input type="checkbox"/> BLACK LIGHT S/N <u>16459</u>
DEVELOPER	<u>S2052</u>	MINIMUM DWELL TIME <u>10</u> MIN.	<input type="checkbox"/> OUTPUT > 1000 μ W/cm ²
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> AMBIENT < 2 fc
			<input type="checkbox"/> LIGHTING EQUIP. <input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT
			<input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
			OTHER
			LIGHT METER S/N <u>1098886</u> CAL DUE DATE <u>2-19-13</u>

TEST SURFACE			
SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input checked="" type="checkbox"/> MACHINED
SURFACE TEMPERATURE	<input type="checkbox"/> < -4°C/ 20°F	<input type="checkbox"/> -4°C/ 20°F TO 10°C/50°F	<input checked="" type="checkbox"/> 10°C/50°F TO 52°C/125°F
			<input type="checkbox"/> SHOT BLASTED
			<input type="checkbox"/> CLEAN BARE METAL

RESULTS- (<input type="checkbox"/> METRIC <input checked="" type="checkbox"/> IMPERIAL)																																	
<table border="1"><tr><td>1</td><td>73974</td><td>- CROSSTUBE</td><td>X</td></tr><tr><td>1</td><td>78577</td><td>- CROSSTUBE</td><td>X</td></tr><tr><td>1</td><td>78578</td><td>- CROSSTUBE</td><td>X</td></tr><tr><td>1</td><td>79633</td><td>- CROSSTUBE</td><td>X</td></tr><tr><td>1</td><td>79632</td><td>- CROSSTUBE</td><td>X</td></tr><tr><td>1</td><td>76247</td><td>- CROSSTUBE</td><td>X</td></tr><tr><td>1</td><td>76246</td><td>- CROSSTUBE</td><td>✓</td></tr><tr><td>1</td><td>78907</td><td>- SLEEVE'S</td><td>X</td></tr></table>	1	73974	- CROSSTUBE	X	1	78577	- CROSSTUBE	X	1	78578	- CROSSTUBE	X	1	79633	- CROSSTUBE	X	1	79632	- CROSSTUBE	X	1	76247	- CROSSTUBE	X	1	76246	- CROSSTUBE	✓	1	78907	- SLEEVE'S	X	<p><u>- HAD BEEN RESEALD PLACE</u></p> <p><u>Sizlonke</u></p>
1	73974	- CROSSTUBE	X																														
1	78577	- CROSSTUBE	X																														
1	78578	- CROSSTUBE	X																														
1	79633	- CROSSTUBE	X																														
1	79632	- CROSSTUBE	X																														
1	76247	- CROSSTUBE	X																														
1	76246	- CROSSTUBE	✓																														
1	78907	- SLEEVE'S	X																														

Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE	<u>Andrew Sheldon</u>	DTR #	<u>E-68717</u>
TECHNICIAN (SIGNATURE):	<u>[Signature]</u>	REPORT	
NAME (PRINT):	<u>Mike Huston</u>	REVIEWED BY:	
	1 ST TECHNICIAN	NAME	INITIALS
CGSB LEVEL	<u>II</u>	CGSB LEVEL	
CGSB REG. NO.	<u>6666</u>	CGSB REG. NO.	

WHITE - CLIENT COPY

CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

GOLD - OFFICE COPY